

## REMARKS

Herein, the "Action" or "Office Action" refers to the Office Action dated October 9, 2003.

Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 39-48 are added above. Claims 1-48 are presently pending. No claims are amended, withdrawn, or cancelled herein.

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## Formal Objections

### Specification

The Office notes that the incorporation of essential material by reference to a “foreign application or patent, or to a publication” is improper. Furthermore, the Office notes that page 22 of the application does not include the serial number and filing date of the reference patent application.

The application incorporates by reference a co-pending *U.S.* Patent Application rather than a *foreign* one. Herein, Applicant amends page 22 of the specification to clarify the nationality of the application being incorporated and provide the serial number and filing date of the incorporated application.

### Drawings

The Office indicates that the drawings fail to comply with 37 CFR § 1.84(p)(4) because differing reference characters (e.g., “32-44” and “232-244”) are used to designate “routers” across the drawings of Figs. 1 and 4. Also, differing reference characters are used to designate “clients,” differing reference characters are used to designate “packets,” and differing reference characters are used to designate “satellite” across the drawings of Figs. 1 and 4

37 CFR § 1.84(p)(4) reads [with emphasis added]:

The **same** part of an invention appearing in more than one **view** of the drawing must always be designated by the same reference character, and the same reference character must never be used to designate different parts.

The cited parts in Figs. 1 and 4 having the same name (e.g., “router,” “clients,” “packets,” and “satellite”) are nominally the same. However, Applicant

1 submits that the drawings of Figs. 1 and 4 are not just “more than one view” of the  
2 same drawing of an embodiment of the invention.

3 The drawing in Fig. 1 does not necessarily represent an embodiment of the  
4 invention. Rather, as indicated by the “background” label, Fig. 1 illustrates the  
5 background for understanding the embodiments of the invention. In other words,  
6 it illustrates the conventional approaches.

7 Fig. 4 does not have such a label. It illustrates the environment,  
8 components, and function of one or more embodiments of the invention.

9 Applicant does not consider the nominally similar parts of Fig. 1 and 4 the  
10 “same parts of the invention.” Accordingly, Applicant submits that Figs. 1 and 4,  
11 as is, comply with the requirements of 37 CFR § 1.84(p)(4). Applicant asks the  
12 Office withdraw its objection.

## 13 14 **SUBSTANTIVE CLAIM REJECTIONS**

### 15 16 **Claim Rejections under §§ 102 and 103**

17 The Office rejects all pending claims under §102 and §103. For the reasons  
18 set forth below, the Office has not shown that the cited reference(s) anticipate (i.e.,  
19 §102) the recited claims. For the reasons set forth below, the Office has not made  
20 out a *prima facie* case of obviousness (i.e., §103). Accordingly, Applicant  
21 respectfully requests that the rejections be withdrawn and the case be passed along  
22 to issuance.

23 The Office’s rejections are based upon one or more of the following  
24 references:  
25

1                   **Gunningberg:** *Gunningberg et al.*, "How a Large ATM MTU  
2                   Causes Deadlocks in TCP Data Transfers", IEEE/ACM Transactions  
3                   on Networking, Vol. 3, Issues 4, (1995);

- 4                   • **Munger:** *Munger et al.*, US Patent No. 6,502,135;
- 5                   • **Khali:** *Khalil et al.*, "Performance Considerations for TCP/IP in  
6                   Wide Area Networks", IEEE (1994).

### 7

8                   **Overview of the Application**

9                   The application describes techniques for fast dynamic measurement of  
10                  bandwidth in a TCP network environment that utilizes a single pair of packets (i.e.,  
11                  a "packet pair") to calculate bandwidth between two entities on a network (such as  
12                  the Internet).

13                 On its journey across a network, packet pairs may be delayed by  
14                 communication devices. In particular, TCP networks have two algorithms  
15                 designed to delay some packets with the goal of increasing the overall *throughput*  
16                 of the network. However, these algorithms effectively delay a packet pair designed  
17                 to quickly measure bandwidth. Therefore, these algorithms distort the  
18                 measurement. These algorithms are "Nagle" and "Slow Start."

19                 The Nagle Algorithm was designed to avoid problems with small TCP  
20                 segments (sometimes called "tinygrams") on slow networks. With this algorithm  
21                 active, communications devices on a network will introduce a 200 milliseconds  
22                 (msec) delay under specific circumstances:

23                 Setting TCP\_NODELAY on the socket of the sending side deactivates the  
24                 Nagle Algorithm. All data sent will go immediately, no matter what the data size.

1 The "Slow Start" algorithm dampens the jack-rabbit start of the initial  
2 connection of TCP network devices. Doing this improves the overall throughput.  
3 It operates by observing that the rate at which new packets should be injected into  
4 the network is the rate at which the acknowledgments are returned by the other  
5 end. These acknowledgements delay the initial start of the communication  
6 between two entities on a network

7 The application is directed to techniques for measuring bandwidth, where  
8 such techniques implement countermeasures to overcome the delays  
9

10 **Gunningberg**

11 The Office cites Gunningberg in its anticipation rejections. Also,  
12 Gunningberg is the primary reference cited in the Office's obviousness rejections.

13 Gunningberg investigates a problem, described as "deadlock." At p. 410,  
14 col.1, ¶ 2, Gunningberg says, "This paper explains the causes of deadlocks and  
15 discusses some of the means for solving the underlying problems."

16 Deadlock **only** occurs when the Nagle Algorithm is **enabled**. At col. 2, p.  
17 416, 3<sup>rd</sup> full ¶, Gunningberg says, "[a] deadlock situation occurs when the TCP  
18 client refrains from sending the last segment of a request due to Nagle's  
19 algorithm...." Gunningberg indicates that the Nagle Algorithm may be turned off  
20 .At col. 2, p. 411, lines 8-9, Gunningberg states that "The Nagle Algorithm can be  
21 switched off by the TCP\_NODELAY" socket option. Doing this disables the  
22 inherent delay introduced by the Nagle Algorithm. Disabling the Nagle Algorithm  
23 is the "most straightforward way" to avoid the deadlock situations (see p. 410, col.  
24 1, 2<sup>nd</sup> ¶).  
25

1 In section IV on page 416, Gunningberg wanted to show without any doubt  
2 that the deadlock problem would cause a delay of up to 200 ms. But if the  
3 experiments were performed only once, the measured response time could be  
4 anywhere between 0 and 200 ms. So, Gunningberg repeated each experiment  
5 multiple (e.g., 100) times. To produce conditions when the deadlock would occur,  
6 each experiment was performed directly after the preceding one.

7 After its description of sending multiple RPCs, the first full sentence of col.  
8 1 of page 417 of Gunningberg says, “[w]hen deadlocks occur within consecutive  
9 calls...” As indicated earlier, for a deadlock to occur, the Nagle Algorithm must  
10 be active.

11 Gunningberg discloses disabling of the Nagle Algorithm. However, it does  
12 this in the context of describing it as the “most straightforward way” to avoid the  
13 deadlock situations (see p. 410, col. 1, 2<sup>nd</sup> ¶).

14 At subsection IV.A (starting on p. 416), Gunningberg discloses the sending  
15 of multiple “RPC’s back-to-back” (Remote Procedure Calls) from one entity to  
16 another on a network. However, when doing so, the Nagle Algorithm must be  
17 enabled in order to test the deadlock problem. The Nagle Algorithm (and its  
18 inherent delay) must be enabled when conducting these tests. Otherwise, it could  
19 not test the very problem of deadlock that was the focus of the experiments.

20 Therefore, Gunningberg never discloses both the disabling of the Nagle  
21 Algorithm and the sending of multiple RPC’s back-to-back together.

22 Furthermore, in its experiments, Gunningberg offers no discussion  
23 regarding the acceptability or tolerability of any experimentally measured delay  
24 between RPCs.  
25

Moreover, Gunningberg does not disclose the use of a “push” data segment will effectively “push” any previously sent segment.

In subsection III.E on page 415, Gunningberg discloses sending another  $(S_{\text{byte}} - b_{\text{byte}})$  bytes in a transmission **only if**  $(S_{\text{byte}} - b_{\text{byte}}) \geq$  half of the maximum advertised window size (R). On page 415, col. 2, lines 3-5, Gunningberg indicates that given this condition, a segment of  $(S_{\text{byte}} - b_{\text{byte}})$  bytes will be transmitted independent of the Nagle Algorithm.

Other than size of data in the advertised window, Gunningberg does not disclose any relationship or conditions between the  $(S_{\text{byte}} - b_{\text{byte}})$  segment and any previously sent segments. Furthermore, Gunningberg does not indicate that sending the  $(S_{\text{byte}} - b_{\text{byte}})$  segment will effectively “push” any previously sent segments.

## Anticipation Rejections

### **Based on Gunningberg**

The Office has rejected claims 1-6, 8, 9, 16, 20, 24-26, 28, 30-38 under 35 USC § 102(b) as being anticipated by Gunningberg. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejection of these claims.

### Claims 1 and 30

Claims 1 and 30 recite (with the portions of Gunningberg cited by the Office in the parentheses):

1 sending a delay-disable command; (page 411, col. 2, 2nd ¶,  
2 lines 8-13)

3 sending a set of packets from a sending entity to a receiving  
4 entity (page 416, col. 2, lines 56-63)

5 In order to anticipate these claims, Applicant submits that Gunningberg  
6 must disclose every element and feature of the claims. Furthermore, each element  
7 and feature **must be arranged as in the claims**. Applicant respectfully submits  
8 that Gunningberg does not disclose the claimed arrangements of the elements and  
9 features of these claims.

10 Gunningberg discloses disabling of the Nagle Algorithm. However, it does  
11 this in the context of describing it as the “most straightforward way” to avoid the  
12 deadlock situations (see p. 410, col. 1, 2<sup>nd</sup> ¶).

13 At subsection IV.A (starting on p. 416), Gunningberg discloses the sending  
14 of multiple “RPC’s back-to-back” (Remote Procedure Calls) from one entity to  
15 another on a network. However, when doing so, the Nagle Algorithm must be  
16 enabled in order to test the deadlock problem. The Nagle Algorithm (and its  
17 inherent delay) must be enabled when conducting these tests. Otherwise, it could  
18 not test the very problem of deadlock that was the focus of the experiments.

19 Therefore, Gunningberg does not disclose both “sending a delay-disable  
20 command” and “sending a set of packets from a sending entity to a receiving  
21 entity.”

22 According to Gunningberg, the disablement of the Nagle Algorithm and its  
23 experiment (using multiple RPCs) are *not* performed together. Indeed, they  
24 cannot be performed together because it is the delay caused by the Nagle  
25



1 Algorithm that is the focus of Gunningberg's testing. See section IV starting on  
2 page 416.

3 Therefore, the Applicant submits that Gunningberg fails to disclose the  
4 claimed arrangements of the elements and features of these claims. Accordingly,  
5 Applicant asks the Office to withdraw its rejection of these claims.

6  
7 Claims 2-8

8 These claims ultimately depend upon independent claim 1. As discussed  
9 above, claim 1 is allowable.

10 In addition to its own merits, each of these dependent claims is allowable  
11 for the same reasons that its base claim is allowable. Applicant submits that the  
12 Office withdraw the rejection of each of these dependent claims because its base  
13 claim is allowable.

14  
15 Claims 9 and 31

16 Claims 9 and 31 recite (with the portions of Gunningberg cited by the  
17 Office in the parentheses):

18  
19 sending a set of packets from a sending entity to a receiving  
20 entity, wherein a transmission delay between packets in the set is  
21 intolerable; (page 416, col. 2, lines 56-63)

22 immediately thereafter, sending at least one "push" packet to  
23 avert a transmission delay between packets in the set, wherein the  
24 delay is caused by packet buffering of a communication device on  
25 the network. (page 415, col. 1 and 2, which is a sub-section titled  
"Boundary Effects.")

1  
2 At subsection IV.A on pages 416-417, Gunningberg describes an  
3 experiment to show the deadlock problem would cause a delay of up to 200 ms.  
4 To produce conditions when the deadlock would occur, each experiment was  
5 performed directly after the preceding one. In this experiment, there is no  
6 discussion regarding the tolerability of any experimentally measured delay  
7 between RPCs.

8 At subsection III.E on page 415, Gunningberg discloses sending of an extra  
9  $(S_{\text{byte}} - b_{\text{byte}})$  bytes **only if**  $(S_{\text{byte}} - b_{\text{byte}}) \geq \text{half}$  of the maximum advertised window  
10 size (R). However, the purpose of this extra segment is merely to send as much  
11 data within a defined window size as possible. Nothing is mentioned about this  
12 extra segment having any form of affect on previously sent segments.

13 Furthermore, on page 415, col. 2, lines 3-5, Gunningberg indicates that  
14 given this condition (when  $(S_{\text{byte}} - b_{\text{byte}}) \geq \text{half } R$ ), a segment of  $(S_{\text{byte}} - b_{\text{byte}})$  bytes  
15 will be transmitted and this transmission is independent of the Nagle Algorithm.

16 Other than size of data in the advertised window, Gunningberg does not  
17 disclose any relationship or conditions between the  $(S_{\text{byte}} - b_{\text{byte}})$  segment and any  
18 previously sent segments. Furthermore, Gunningberg does not indicate that  
19 sending the  $(S_{\text{byte}} - b_{\text{byte}})$  segment will effectively “push” any previously sent  
20 segments.

21 Applicant asks the Office to point to the precise location of the language  
22 that discloses this feature in Gunningberg.

23 Applicant respectfully submits that Gunningberg does not disclose the  
24 claimed arrangements of the elements and features of these claims. In particular,  
25 Gunningberg fails to disclose that a “transmission delay between packets [] is

1 intolerable” and it fails to disclose the sending of “at least one ‘push’ packet to  
2 avert a transmission delay between packets.”

3 Instead, the extra ( $S_{\text{byte}} - b_{\text{byte}}$ ) segment of Gunningberg is sent when the  
4 extra segment itself may be transmitted without delay. Applicant submits that this  
5 does not “avert a transmission delay between” packets that were previously sent.  
6 Furthermore, Gunningberg does not disclose the sending of such a “push” packet  
7 “immediately [ ]after” the sending packets....”

8 Therefore, the Applicant submits that Gunningberg fails to disclose the  
9 claimed arrangements of the elements and features of these claims. Accordingly,  
10 Applicant asks the Office to withdraw its rejection of these claims.

11  
12 Claims 10-15

13 These claims ultimately depend upon independent claim 9. As discussed  
14 above, claim 9 is allowable.

15 In addition to its own merits, each of these dependent claims is allowable  
16 for the same reasons that its base claim is allowable. Applicant submits that the  
17 Office withdraw the rejection of each of these dependent claims because its base  
18 claim is allowable.

19  
20 Claims 16 and 32

21 Claims 16 and 32 recite (with the portions of Gunningberg cited by the  
22 Office in the parentheses):  
23  
24  
25

1 sending a set of packets from a sending entity to a receiving  
2 entity, wherein a transmission delay between packets in the set is  
3 intolerable; (page 416, col. 2, lines 56-63)

4 immediately before, sending at least one “priming” packet to  
5 avoid a transmission delay between packets in the set, wherein the  
6 delay is caused by flow-control functions of a communication device  
7 on the network. (page 410, col. 2, lines 61-67)

8 To produce conditions when the deadlock would occur, each experiment to  
9 measure the delay between back-to-back RPCs is documented by Gunningberg in  
10 subsection IV.A on pages 416-417. There is no discussion regarding the  
11 acceptability or tolerability of any experimentally measured delay between RPCs.

12 Furthermore, Gunningberg does not disclose the use of a “priming” data  
13 segment that will effectively “prime” a set of packets sent immediately before.

14 At subsection II.B on page 410-411 (the text cited by the Office),  
15 Gunningberg discusses TCP acknowledgement strategy and flow control. It does  
16 not disclose any type of packet that may be used to “prime” or one that is sent  
17 “immediately before” a “set of packets.” Indeed, Applicant cannot find any  
18 discussion in Gunningberg of “priming” packets or anything analogous thereto.  
19 Applicant submits the Gunningberg does not disclose this feature.

20 If Applicant is wrong, then Applicant asks the Office to point to the precise  
21 location of the language that discloses this feature in Gunningberg.

22 Applicant submits that Gunningberg fails to disclose that a “transmission  
23 delay between packets [] is intolerable” and it fails to disclose the sending of “at  
24 least one ‘priming’ packet to avoid a transmission delay between packets.” It also  
25

1 fails to disclose the sending of a “priming” packet “immediately before” the  
2 sending of packets.

3 Accordingly, Applicant asks the Office to withdraw its rejection of these  
4 claims.

5  
6 Claims 17-23

7 These claims ultimately depend upon independent claim 16. As discussed  
8 above, claim 16 is allowable.

9 In addition to its own merits, each of these dependent claims is allowable  
10 for the same reasons that its base claim is allowable. Applicant submits that the  
11 Office withdraw the rejection of each of these dependent claims because its base  
12 claim is allowable.

13  
14 Claim 24

15 Claim 24 recites (with the portions of Gunningberg cited by the Office in  
16 the parentheses):

17 sending a delay-disable command; (page 411, col. 2, 2<sup>nd</sup> ¶,  
18 lines 8-13)

19 sending a pair of bandwidth-measurement packets from a  
20 sending entity to a receiving entity. (page 416, col. 2, lines 56-63)

21  
22  
23 Applicant respectfully submits that Gunningberg does not disclose the  
24 claimed arrangements of the elements and features of this claim.

1 Gunningberg discloses disabling of the Nagle Algorithm. However, it does  
2 this in the context of describing it as the “most straightforward way” to avoid the  
3 deadlock situations (see p. 410, col. 1, 2<sup>nd</sup> ¶).

4 At subsection IV.A (starting on p. 416), Gunningberg discloses the sending  
5 of multiple “RPC’s back-to-back” (Remote Procedure Calls) from one entity to  
6 another on a network. However, when doing so, the Nagle Algorithm must be  
7 enabled in order to test the deadlock problem. The Nagle Algorithm (and its  
8 inherent delay) must be enabled when conducting these tests. Otherwise, it could  
9 not test the very problem of deadlock that was the focus of the experiments.

10 According to Gunningberg, the disablement of the Nagle Algorithm and its  
11 experiment (using multiple RPCs) are *not* performed together. Indeed, they  
12 cannot be performed together because it is the delay caused by the Nagle  
13 Algorithm that is the focus of Gunningberg’s testing. See section IV starting on  
14 page 416.

15 Therefore, Gunningberg does not disclose both “sending a delay-disable  
16 command” and “sending a pair of bandwidth-measurement packets.”

17 Therefore, the Applicant submits that Gunningberg fails to disclose the  
18 claimed arrangements of the elements and features of this claim. Accordingly,  
19 Applicant asks the Office to withdraw its rejection of this claim.

20  
21 Claim 25

22 This claim ultimately depends upon independent claim 24. As discussed  
23 above, claim 24 is allowable.  
24  
25

1 In addition to its own merits, this dependent claim is allowable for the same  
2 reasons that its base claim is allowable. Applicant submits that the Office  
3 withdraw the rejection of this dependent claim because its base claim is allowable.  
4

5 Claim 26

6 Claim 26 recites (with the portions of Gunningberg cited by the Office in  
7 the parentheses):

8 sending a pair of bandwidth-measurement packets from a  
9 sending entity to a receiving entity, wherein a transmission delay  
10 between packets in the pair is intolerable; (page 416, col. 2, lines 56-  
11 63)

12 immediately thereafter, sending at least one “push” packet to  
13 avert a transmission delay between packets in the pair, wherein the  
14 delay is caused by packet buffering of a communication device on  
15 the network. (page 415, col. 1 and 2, which is a sub-section titled  
16 “Boundary Effects.”)

17 To produce conditions when the deadlock would occur, each experiment to  
18 measure the delay between back-to-back RPCs is documented by Gunningberg in  
19 subsection IV.A on pages 416-417. There is no discussion regarding the  
20 acceptability or tolerability of any experimentally measured delay between RPCs.

21 Furthermore, Gunnigberg does not disclose the use of a “push” data  
22 segment will effectively “push” any previously sent segment.

23 At subsection III.E on page 415, Gunningberg discloses sending an  
24 additional package of date of size  $(S_{\text{byte}} - b_{\text{byte}})$  bytes **only if**  $(S_{\text{byte}} - b_{\text{byte}}) \geq \text{half of}$   
25

1 the maximum advertised window size (R). On page 415, col. 2, lines 3-5,  
2 Gunningberg indicates that given this condition, a segment of ( $S_{\text{byte}} - b_{\text{byte}}$ ) bytes  
3 will be transmitted independent of the Nagle Algorithm.

4 Other than size of data in the advertised window, Gunningberg does not  
5 disclose any relationship or conditions between the ( $S_{\text{byte}} - b_{\text{byte}}$ ) segment and any  
6 previously sent segments. Furthermore, Gunningberg does not indicate that  
7 sending the ( $S_{\text{byte}} - b_{\text{byte}}$ ) segment will effectively “push” any previously sent  
8 segments.

9 If Applicant is wrong, then Applicant asks the Office to point to the precise  
10 location of the language that discloses this feature in Gunningberg.

11 Applicant respectfully submits that Gunningberg does not disclose the  
12 claimed arrangements of the elements and features of this claim. In particular,  
13 Gunningberg fails to disclose that a “transmission delay between packets [] is  
14 intolerable” and it fails to disclose the sending of “at least one ‘push’ packet to  
15 avert a transmission delay between packets.”

16 Instead, the ( $S_{\text{byte}} - b_{\text{byte}}$ ) segment of Gunningberg is sent when the segment  
17 itself may be transmitted without delay. Applicant submits that this does not  
18 “avert a transmission delay between” packets that were previously sent.  
19 Furthermore, Gunningberg does not disclose the sending of such a “push” packet  
20 “immediately []after” the sending packets....”

21 Therefore, the Applicant submits that Gunningberg fails to disclose the  
22 claimed arrangements of the elements and features of this claim. Accordingly,  
23 Applicant asks the Office to withdraw its rejection of this claim.  
24  
25



Claim 27

This claim ultimately depends upon independent claim 26. As discussed above, claim 26 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

Claim 28

Claim 28 recites (with the portions of Gunningberg cited by the Office in the parentheses):

sending a pair of bandwidth-measurement packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the pair is intolerable; (page 416, col. 2, lines 56-63)

immediately before, sending at least one “priming” packet to avoid a transmission delay between packets in the pair, wherein the delay is caused by flow-control functions of a communication device on the network. (page 410, col. 2, lines 61-67)

To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Furthermore, Gunnigberg does not disclose the use of a “priming” data segment that will effectively “prime” a set of packets sent immediately before.

1 At subsection II.B on page 410-411 (the text cited by the Office),  
2 Gunningberg discusses TCP acknowledgement strategy and flow control. It does  
3 not disclose any type of packet that may be used to “prime” or one that is sent  
4 “immediately before” a “set of packets.” Indeed, Applicant cannot find any  
5 discussion in Gunningberg of “priming” packets or anything analogous thereto.  
6 Applicant submits the Gunningberg does not disclose this feature.

7 If Applicant is wrong, then Applicant asks the Office to point to the precise  
8 location of the language that discloses this feature in Gunningberg.

9 Applicant submits that Gunningberg fails to disclose that a “transmission  
10 delay between packets [] is intolerable” and it fails to disclose the sending of “at  
11 least one ‘priming’ packet to avoid a transmission delay between packets.” It also  
12 fails to disclose the sending of a “priming” packet “immediately before” the  
13 sending of packets.

14 Accordingly, Applicant asks the Office to withdraw its rejection of this  
15 claim.

16  
17 Claim 29

18 This claim ultimately depends upon independent claim 28. As discussed  
19 above, claim 28 is allowable.

20 In addition to its own merits, this dependent claim is allowable for the same  
21 reasons that its base claim is allowable. Applicant submits that the Office  
22 withdraw the rejection of this dependent claim because its base claim is allowable.  
23  
24  
25

Claim 33

Claim 33 recites (with the portions of Gunningberg cited by the Office in the parentheses):

send a delay-disable command; (page 411, col. 2, 2<sup>nd</sup> ¶, lines 8-13)

send a set of packets from a sending entity to a receiving entity. (page 416, col. 2, lines 56-63)

Applicant respectfully submits that Gunningberg does not disclose the claimed arrangements of the elements and features of this claim.

Gunningberg discloses disabling of the Nagle Algorithm. However, it does this in the context of describing it as the “most straightforward way” to avoid the deadlock situations (see p. 410, col. 1, 2<sup>nd</sup> ¶).

At subsection IV.A (starting on p. 416), Gunningberg discloses the sending of multiple “RPC’s back-to-back” (Remote Procedure Calls) from one entity to another on a network. However, when doing so, the Nagle Algorithm must be enabled in order to test the deadlock problem. The Nagle Algorithm (and its inherent delay) must be enabled when conducting these tests. Otherwise, it could not test the very problem of deadlock that was the focus of the experiments.

Therefore, Gunningberg does not disclose both “send[ing] a delay-disable command” and “send[ing] a set of packets from a sending entity to a receiving entity.”

1 Therefore, the Applicant submits that Gunningberg fails to disclose the  
2 claimed arrangements of the elements and features of this claim. Accordingly,  
3 Applicant asks the Office to withdraw its rejection of this claim.

4  
5 Claim 34

6 Claim 34 recites (with the portions of Gunningberg cited by the Office in  
7 the parentheses):

8  
9 send a set of packets from a sending entity to a receiving  
10 entity, wherein a transmission delay between packets in the set is  
11 intolerable; (page 416, col. 2, lines 56-63)

12 immediately thereafter, send at least one “push” packet to  
13 avert a transmission delay between packets in the set, wherein the  
14 delay is caused by packet buffering of a communication device on  
15 the network. (page 415, col. 1 and 2, which is a sub-section titled  
16 “Boundary Effects.”)

17 To produce conditions when the deadlock would occur, each experiment to  
18 measure the delay between back-to-back RPCs is documented by Gunningberg in  
19 subsection IV.A on pages 416-417. There is no discussion regarding the  
20 acceptability or tolerability of any experimentally measured delay between RPCs.

21 Furthermore, Gunnigberg does not disclose the use of a “push” data  
22 segment will effectively “push” any previously sent segment.

23 At subsection III.E on page 415, Gunningberg discloses sending an  
24 additional package of date of size  $(S_{\text{byte}} - b_{\text{byte}})$  bytes **only if**  $(S_{\text{byte}} - b_{\text{byte}}) \geq \text{half of}$   
25 the maximum advertised window size (R). On page 415, col. 2, lines 3-5,

1 Gunningberg indicates that given this condition, a segment of  $(S_{\text{byte}} - b_{\text{byte}})$  bytes  
2 will be transmitted independent of the Nagle Algorithm.

3 Other than size of data in the advertised window, Gunningberg does not  
4 disclose any relationship or conditions between the  $(S_{\text{byte}} - b_{\text{byte}})$  segment and any  
5 previously sent segments. Furthermore, Gunningberg does not indicate that  
6 sending the  $(S_{\text{byte}} - b_{\text{byte}})$  segment will effectively “push” any previously sent  
7 segments.

8 If Applicant is wrong, then Applicant asks the Office to point to the precise  
9 location of the language that discloses this feature in Gunningberg.

10 Applicant respectfully submits that Gunningberg does not disclose the  
11 claimed arrangements of the elements and features of this claim. In particular,  
12 Gunningberg fails to disclose that a “transmission delay between packets [] is  
13 intolerable” and it fails to disclose the sending of “at least one ‘push’ packet to  
14 avert a transmission delay between packets.”

15 Instead, the  $(S_{\text{byte}} - b_{\text{byte}})$  segment of Gunningberg is sent when the segment  
16 itself may be transmitted without delay. Applicant submits that this does not  
17 “avert a transmission delay between” packets that were previously sent.  
18 Furthermore, Gunningberg does not disclose the sending of such a “push” packet  
19 “immediately []after” the sending packets....”

20 Therefore, the Applicant submits that Gunningberg fails to disclose the  
21 claimed arrangements of the elements and features of this claim. Accordingly,  
22 Applicant asks the Office to withdraw its rejection of this claim.  
23  
24  
25

Claim 35

Claim 35 recites (with the portions of Gunningberg cited by the Office in the parentheses):

send a pair of bandwidth-measurement packets from a sending entity to a receiving entity, wherein a transmission delay between packets in the pair is intolerable; (page 416, col. 2, lines 56-63)

immediately before, send at least one “priming” packet to avoid a transmission delay between packets in the pair, wherein the delay is caused by flow-control functions of a communication device on the network .(page 410, col. 2, lines 61-67)

To produce conditions when the deadlock would occur, each experiment to measure the delay between back-to-back RPCs is documented by Gunningberg in subsection IV.A on pages 416-417. There is no discussion regarding the acceptability or tolerability of any experimentally measured delay between RPCs.

Furthermore, Gunnigberg does not disclose the use of a “priming” data segment that will effectively “prime” a set of packets sent immediately before.

At subsection II.B on page 410-411 (the text cited by the Office), Gunningberg discusses TCP acknowledgement strategy and flow control. It does not disclose any type of packet that may be used to “prime” or one that is sent “immediately before” a “set of packets.” Indeed, Applicant cannot find any discussion in Gunningberg of “priming” packets or anything analogous thereto. Applicant submits the Gunningberg does not disclose this feature.

1 If Applicant is wrong, then Applicant asks the Office to point to the precise  
2 location of the language that discloses this feature in Gunningberg.

3 Applicant submits that Gunningberg fails to disclose that a “transmission  
4 delay between packets [] is intolerable” and it fails to disclose the sending of “at  
5 least one ‘priming’ packet to avoid a transmission delay between packets.” It also  
6 fails to disclose the sending of a “priming” packet “immediately before” the  
7 sending of packets.

8 Accordingly, Applicant asks the Office to withdraw its rejection of this  
9 claim.

10  
11 Claim 36

12 Claim 36 recites (with the portions of Gunningberg cited by the Office in  
13 the parentheses):  
14

15 a first field including a delay-disable command; (page 411,  
16 col. 2, 2<sup>nd</sup> ¶, lines 8-13)

17 a second field including a first bandwidth-measurement  
18 packet;

19 a third field including a second bandwidth-measurement  
20 packet.( Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page  
21 417, col. 1, 1<sup>st</sup> ¶)

22 Applicant respectfully submits that Gunningberg does not disclose the  
23 claimed arrangements of the elements and features of this claim.  
24  
25

1 Gunningberg discloses disabling of the Nagle Algorithm. However, it does  
2 this in the context of describing it as the “most straightforward way” to avoid the  
3 deadlock situations (see p. 410, col. 1, 2<sup>nd</sup> ¶).

4 At subsection IV.A (starting on p. 416), Gunningberg discloses the sending  
5 of multiple “RPC’s back-to-back” (Remote Procedure Calls) from one entity to  
6 another on a network. However, when doing so, the Nagle Algorithm must be  
7 enabled in order to test the deadlock problem. The Nagle Algorithm (and its  
8 inherent delay) must be enabled when conducting these tests. Otherwise, it could  
9 not test the very problem of deadlock that was the focus of the experiments.

10 Therefore, Gunningberg does not disclose both “a first field including a  
11 delay-disable command” and two other fields with “bandwidth-measurement”  
12 packets.

13 Therefore, the Applicant submits that Gunningberg fails to disclose the  
14 claimed arrangements of the elements and features of this claim. Accordingly,  
15 Applicant asks the Office to withdraw its rejection of this claim.

16  
17 Claims 37

18 Claim 37 recites (with the portions of Gunningberg cited by the Office in  
19 the parentheses):

20  
21 a first field including a first bandwidth-measurement packet;

22 a second field including a second bandwidth-measurement  
23 packet; (Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page  
24 417, col. 1, 1<sup>st</sup> ¶)

25 a third field including a “push” packet facilitating  
minimization of transmission delay between the first and second



1 packets, wherein the delay is caused by packet buffering of a  
2 communication device on the network. (page 415, col. 1 and 2,  
3 which is a sub-section titled "Boundary Effects.")

4 To produce conditions when the deadlock would occur, each experiment to  
5 measure the delay between back-to-back RPCs is documented by Gunningberg in  
6 subsection IV.A on pages 416-417. There is no discussion regarding the  
7 acceptability or tolerability of any experimentally measured delay between RPCs.

8 Furthermore, Gunningberg does not disclose the use of a "push" data  
9 segment will effectively "push" any previously sent segment.

10 At subsection III.E on page 415, Gunningberg discloses sending an  
11 additional package of data of size  $(S_{\text{byte}} - b_{\text{byte}})$  bytes **only if**  $(S_{\text{byte}} - b_{\text{byte}}) \geq \text{half}$  of  
12 the maximum advertised window size (R). On page 415, col. 2, lines 3-5,  
13 Gunningberg indicates that given this condition, a segment of  $(S_{\text{byte}} - b_{\text{byte}})$  bytes  
14 will be transmitted independent of the Nagle Algorithm.

15 Other than size of data in the advertised window, Gunningberg does not  
16 disclose any relationship or conditions between the  $(S_{\text{byte}} - b_{\text{byte}})$  segment and any  
17 previously sent segments. Furthermore, Gunningberg does not indicate that  
18 sending the  $(S_{\text{byte}} - b_{\text{byte}})$  segment will effectively "push" any previously sent  
19 segments.

20 If Applicant is wrong, then Applicant asks the Office to point to the precise  
21 location of the language that discloses this feature in Gunningberg.

22 Applicant respectfully submits that Gunningberg does not disclose the  
23 claimed arrangements of the elements and features of this claim. In particular,  
24 Gunningberg fails to disclose the three claimed fields together.  
25

1 Instead, the ( $S_{\text{byte}} - b_{\text{byte}}$ ) segment of Gunningberg is sent when the segment  
2 itself may be transmitted without delay. Applicant submits that this does not  
3 facilitate the “minimization of transmission delay between the first and second  
4 packets.”

5 Therefore, the Applicant submits that Gunningberg fails to disclose the  
6 claimed arrangements of the elements and features of this claim. Accordingly,  
7 Applicant asks the Office to withdraw its rejection of this claim.

8  
9 Claim 38

10 Claim 38 recites (with the portions of Gunningberg cited by the Office in  
11 the parentheses):

12  
13 first field including a “priming” packet; (page 410, col. 2,  
14 lines 61-67)

15 a second field including a first bandwidth-measurement  
16 packet;

17 a third field including a second bandwidth-measurement  
18 packet;

19 wherein the “priming” packet facilitates minimization of  
20 transmission delay between packets, wherein the delay is caused by  
21 flow-control functions of a communication device on the network.  
(Table II, Fig. 9, and page 416, col. 2, lines 56-67 and page 417, col.  
22 1, 1<sup>st</sup> ¶. And page 410, col. 2, lines 61-67)

23  
24 To produce conditions when the deadlock would occur, each experiment to  
25 measure the delay between back-to-back RPCs is documented by Gunningberg in

1 subsection IV.A on pages 416-417. There is no discussion regarding the  
2 acceptability or tolerability of any experimentally measured delay between RPCs.

3 Furthermore, Gunnigberg does not disclose the use of a “priming” data  
4 segment that will effectively “prime” a set of packets sent immediately before.

5 At subsection II.B on page 410-411 (the text cited by the Office),  
6 Gunningberg discusses TCP acknowledgement strategy and flow control. It does  
7 not disclose any type of packet that may be used to “prime” or one that is sent  
8 “immediately before” a “set of packets.” Indeed, Applicant cannot find any  
9 discussion in Gunningberg of “priming” packets or anything analogous thereto.  
10 Applicant submits the Gunningberg does not disclose this feature.

11 If Applicant is wrong, then Applicant asks the Office to point to the precise  
12 location of the language that discloses this feature in Gunningberg.

13 Applicant submits that Gunningberg fails to disclose a “priming” packet  
14 that “facilitates minimization of transmission delay between packets.”

15 Accordingly, Applicant asks the Office to withdraw its rejection of this  
16 claim.

## **OBVIOUSNESS REJECTIONS**

### **Based upon Gunningberg and Munger**

The Office rejects claims 7 and 12 under USC § 103(a) as being unpatentable over Gunningberg and Munger. Applicant traverses this rejection. Reconsideration and allowance of these claims is respectfully requested.

#### **Claim 7**

This claim ultimately depends upon independent claim 1. As discussed above, claim 1 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

#### **Claim 12**

This claim ultimately depends upon independent claim 9. As discussed above, claim 9 is allowable.

In addition to its own merits, this dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of this dependent claim because its base claim is allowable.

1 **Based upon Gunningberg and Khalil**

2 The Office rejects claim 21 under USC § 103(a) as being unpatentable over  
3 Gunningberg and Munger. Applicant traverses this rejection. Reconsideration and  
4 allowance of these claims is respectfully requested.

5 **Claim 21**

6 This claim ultimately depends upon independent claim 16. As discussed  
7 above, claim 16 is allowable.

8 In addition to its own merits, this dependent claim is allowable for the same  
9 reasons that its base claim is allowable. Applicant submits that the Office  
10 withdraw the rejection of this dependent claim because its base claim is allowable.  
11  
12  
13  
14  
15

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1 **Dependent Claims**

2 In addition to its own merits, each dependent claim is allowable for the  
3 same reasons that its base claim is allowable. Applicant submits that the Office  
4 withdraw the rejection of each dependent claim where its base claim is allowable.  
5

6 **Conclusion**

7 All pending claims are in condition for allowance. Applicant respectfully  
8 requests reconsideration and prompt issuance of the application. If any issues  
9 remain that prevent issuance of this application, the Office is urged to contact the  
10 undersigned attorney before issuing a subsequent Action.  
11

12 Respectfully Submitted,

13  
14 Dated: 1-23-04

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